

Claims

1. A portable device provided with a display unit (101, 201, 301), **characterized** in that in the surroundings of said display unit (101, 201, 301), the device includes light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) for indicating information in the view shown in the display unit (101, 201, 301), a controller (305) for defining control commands on the basis of a display unit application and an instantaneous view shown in the display unit (101, 201, 301), and a light driver (304) for controlling the information-indicating light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) according to the control commands transmitted to it in relation to the instantaneous view shown in the display unit (101, 201, 301).
2. A device according to claim 1, **characterized** in that said device also includes a controller (305) for generating control commands for the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) on the basis of the information transmitted by the display driver (303), to the light driver (304).
3. A device according to claims 1–2, **characterized** in that in the surroundings of the display unit (101, 201, 301), there are at least two light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 302a, 302b, 302c, 302d, 302e, 302f) or light unit groups (202e, 202f) formed of single light units, placed so that they are arranged at an angle of 180 degrees with respect to each other.
4. A device according to claims 1–2, **characterized** in that the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) are placed around the display unit (101, 201, 301).
5. A device according to any of the preceding claims, **characterized** in that it is provided with a light driver (304) for controlling the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 302a, 302b, 302c, 302d, 302e, 302f) or the light unit groups (202e, 202f) formed of single light units.
6. A device according to any of the preceding claims, **characterized** in that it is provided with a controller (305) and a light driver (304) for controlling the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e,

202f, 302a, 302b, 302c, 302d, 302e, 302f) according to the application shown in the display unit (101, 201, 301).

7. A device according to any of the preceding claims, **characterized** in that it is provided with a controller (305) for defining the control commands of the light units

5 (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) and for synchronizing the display unit (101, 201, 301) with respect to the view.

8. A device according to claim 7, **characterized** in that it is provided with a light driver (304) for controlling the functions and properties of the light units (102a,

10 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) according to the control commands generated by the controller (305).

9. A method for improving a portable device display unit (101, 201, 301), **characterized** in that

15 – in the surroundings of the display unit (101, 201, 301), there are placed light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f),

20 – in the controller (305) there is defined a control command on the basis of a display unit application and an instantaneous view shown in the display unit (101, 201, 301) in order to controlling light units,

25 – the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) are controlled through the light driver (304) according to the control command defined in the controller (305) with respect to the view shown instantaneously in the display unit (101, 201, 301), and

– information to the view shown in the display unit (101, 201, 301) is indicated by means of the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f).

10. A method according to any of the preceding claims, **characterized** in that in

30 the controller (305), there are generated functional commands to the light driver (304) in order to control the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f)

on the basis of the information of the view in the display unit (101, 201, 301), transmitted by the display driver (303) and the application of the display unit (101, 201, 301).

11. A method according to any of the preceding claims, **characterized** in that the
5 light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c,
202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) are arranged in the
surroundings of the display unit (101, 201, 301), at an angle of 90 degrees with
respect to each other, in order to indicate the direction, with respect to the view
shown in the display unit (101, 201, 301), by means of the light units (102a, 102b,
10 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a,
302b, 302c, 302d, 302e, 302f).
12. A method according to any of the preceding claims, **characterized** in that the
light units are arranged in light unit groups (202e, 202f), each of which groups can
be separately controlled by the light driver (304).
- 15 13. A method according to any of the preceding claims, **characterized** in that in
the display unit (101, 201, 301), there are shown objects under observation, and
simultaneously the light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h,
202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f)
controlled by the light driver (304) are used for generating information in the view
20 of the display.
14. A method according to any of the preceding claims, **characterized** in that the
approaching of an object located outside the view of the display unit (101, 201,
301) to the area of the view shown in the display unit (101, 201, 301) is indicated
by generating in the light driver (304) a sense stimulus by means of those light
25 units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d,
202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) that are located in the same
direction with respect to the view as the target in question.
15. A method according to claim 14, **characterized** in that the light driver (304) is
used for controlling a controllable light unit group (102a, 102b, 102c, 102d, 102e,
30 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d,
302e, 302f), located in a given direction with respect to the view of the display unit
(101, 201, 301), so that the intensity of the light units (102a, 102b, 102c, 102d,
102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c,
302d, 302e, 302f) is increased as the object approaches the display unit.

16. A method according to any of the preceding claims, characterized in that the threatening factors of the game application represented in the view are indicated by adjusting the controllable light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 5 302f) that is located in the direction of the threatening factor with respect to the view by means of the light driver (304) to emit a given wavelength of light, and possible proceeding directions are indicated by controlling the controllable light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 10 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) that is located in the direction of the proceeding direction with respect to the view by means of the light driver (304) to emit another given wavelength of light.

17. A method according to any of the preceding claims, characterized in that in the application shown in the view, the direction of a given searched target that is located outside the view, with respect to the view is indicated by activating the 15 controllable light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) located in the direction of the target by means of the light driver (304) in a given way defined in the application.

18. A software for improving a portable device display unit (101, 201, 301), 20 characterized in that it includes steps where

- there is defined a given controllable light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 25 302c, 302d, 302e, 302f) composed of light units (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) arranged in the surroundings of a display unit (101, 201, 301) on the basis of the application and an instantaneous view shown in the display unit (101, 201, 301),
- there are generated, on the basis of the application of the display unit (101, 30 201, 301), certain control commands in order to control the defined light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) according to the application and the instantaneous view of the display unit (101, 201, 301), and

- the generated control commands are transmitted to the light driver (304) in order to control the defined light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 302b, 302c, 302d, 302e, 302f) in the defined way.

5 19. A system for improving a portable device display unit (101, 201, 301),
characterized in that it includes

- software means for defining a controllable light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 302a, 10
302b, 302c, 302d, 302e, 302f) on the basis of the information of the application shown in the display unit (101, 201, 301) and of the display driver (303), and
- software means for generating certain control commands on the basis of the information of the application of the display unit (101, 201, 301) and of the display driver (303) in order to control a given light unit group (102a, 102b, 102c, 102d, 102e, 102f, 102g, 102h, 202a, 202b, 202c, 202d, 202e, 202f, 15
302a, 302b, 302c, 302d, 302e, 302f) according to the application of the display unit (101, 201, 301) and the current view.